

SB/AT

5

WHAT IS CLAIMED IS

1. A fluid handling device comprising a substrate and an optically transmissive diamond-like film disposed on at least a portion of the substrate.

2. The fluid handling device of claim 1 comprising a capillary having an internal surface and an external surface, wherein at least a portion of at least one of the internal or external surfaces includes an optically transmissive diamond-like film disposed thereon.

3. The fluid handling device of claim 2 wherein the external surface of the capillary includes an optically transmissive diamond-like film disposed on at least a portion thereof.

4. The fluid handling device of claim 1 comprising a microfluidic article comprising a microfluidic handling architecture comprising a fluid handling surface, wherein at least a portion of the fluid handling surface includes an optically transmissive diamond-like film disposed thereon.

5. The fluid handling device of claim 4 wherein the optically transmissive diamond-like film is also hydrophilic.

6. The fluid handling device of claim 4 comprising:
a first non-elastic, polymeric substrate comprising a first major surface that includes the microfluidic handling architecture and a second major surface; and
a second polymeric substrate that is integrally bonded to said second major surface of said first substrate, wherein the second substrate is capable of forming a free-standing substrate in the absence of said first substrate.

7. The fluid handling device of claim 4 comprising a cover layer on the microfluidic handling architecture.

8. The fluid handling device of claim 7 wherein the cover layer is bonded to the first major surface of the first substrate.

5 9. The fluid handling device of claim 4 wherein the microfluidic handling architecture comprises structures selected from the group consisting of microchannels, fluid reservoirs, sample handling regions, and combinations thereof.

10 10. The fluid handling device of claim 9 wherein at least one of the structures comprises a fluid handling surface, at least a portion of which has the optically transmissive diamond-like film disposed thereon.

15 11. The fluid handling device of claim 4 comprising a first polymeric substrate comprising a first major surface that includes a plurality of microfluidic handling architectures and a second major surface, wherein the article is in the form of a roll.

20 12. The fluid handling device of claim 1 wherein the optically transmissive diamond-like film is a diamond-like glass film.

13. The fluid handling device of claim 1 wherein the optically transmissive diamond-like film has disposed thereon linking agents and a reactant affixed to the linking agents to form a binding site.

25 14. The fluid handling device of claim 13 wherein the linking agents are covalently attached to the diamond-like film.

15. The fluid handling device of claim 13 wherein the reactant is selected from the group consisting of nucleic acids, proteins, and carbohydrates.

30 16. The fluid handling device of claim 1 wherein the diamond-like film comprises at least about 25 atomic percent carbon, from 0 to about 50

atomic percent silicon, and from 0 to about 50 atomic percent oxygen, on a hydrogen-free basis.

17. The fluid handling device of claim 1 wherein the diamond-like film is
5 also hydrophilic.

18. A fluid handling device comprising a microfluidic article comprising a
10 microfluidic handling architecture comprising a fluid handling surface
wherein at least a portion of the fluid handling surface includes a
hydrophilic diamond-like film disposed thereon.

19. A fluid handling device comprising a substrate and an optically
15 transmissive and hydrophilic film comprising at least about 25 atomic
percent carbon, from 0 to about 50 atomic percent silicon, and from 0 to
about 50 atomic percent oxygen, on a hydrogen-free basis, disposed on
at least a portion of the substrate.

20. A fluid handling device comprising a substrate and a film comprising at
least about 30 atomic percent carbon, at least about 25 atomic percent
20 silicon, and less than about 45 atomic percent oxygen, on a hydrogen-
free basis, disposed on at least a portion of the substrate.

21. The fluid handling device of claim 20 comprising a capillary having an
internal surface and an external surface, wherein at least a portion of at
25 least one of the internal or external surfaces has the film disposed
thereon.

22. The fluid handling device of claim 21 wherein at least a portion of the
external surface of the capillary has the film disposed thereon.

30

23. The fluid handling device of claim 20 comprising a microfluidic article
comprising a microfluidic handling architecture including a fluid
handling surface wherein at least a portion of the fluid handling surface
has the film disposed thereon.

24. A fluid handling device comprising a microfluidic article comprising a microfluidic handling architecture including a fluid handling surface wherein at least a portion thereof has disposed thereon a film comprising at least about 25 atomic percent carbon, from 0 to about 50 atomic percent silicon, and from 0 to about 50 atomic percent oxygen, on a hydrogen-free basis.

5

25. A fluid handling device comprising a microfluidic article comprising a microfluidic handling architecture including a non-fluid handling surface wherein at least a portion thereof has disposed thereon a diamond-like film that is optically transmissive, hydrophilic, or both.

10

26. A method of manufacturing a hydrophilic diamond-like film, the method comprising treating a diamond-like film in an oxygen-containing plasma.

15